ABSTRACT OF DISCLOSURE

A mass spectrometer of the present invention is based on the use of quadrupole lenses with angular gradient of the electrostatic field. The device consists of an ion source connected to an ion mass separation chamber that contains a plurality of sequentially arranged electrostatic quadrupole lenses which generate a helical electrostatic field for sending ions along helical trajectories in a direct and return stroke. Scattering of positions of points of return is reduced by means of electrostatic mirrors located at the end of the direct stroke, while ions of different masses perform their return strokes along helical trajectories different from those of the direct strokes due to the use of a magnetic and/or electrostatic mirrors. An ion-electron emitting screen is installed on the path of ions in the reverse stroke, and positions of collision of the ions with the ion-electron emitting screen over time and space are detected with the use of micro-channel plate detectors. Movement of ions along the helical trajectory significantly increases the path of ions through the ion separation chamber and, hence, improves the resolution capacity of the mass spectrometer.

Patent Pending